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AEP
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September 17, 2003

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Units 1 and 2
NUCLEAR REGULATORY COMMISSION BULLETIN 2003-02:
LEAKAGE FROM REACTOR PRESSURE VESSEL LOWER HEAD
PENETRATIONS AND REACTOR COOLANT PRESSURE BOUNDARY
INTEGRITY THIRTY-DAY RESPONSE

Reference: Nuclear Regulatory Commission Bulletin 2003-02, "Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity," dated August 21, 2003

In Bulletin 2003-02, the Nuclear Regulatory Commission requested that pressurized-water reactor licensees provide information related to inspections that have been or will be performed to verify the integrity of the reactor pressure vessel (RPV) lower head penetrations. The bulletin also requested that licensees provide the basis for concluding that their plants satisfy applicable regulatory requirements related to the structural and leakage integrity of the RPV lower head penetrations. Licensees with facilities entering refueling outages before December 31, 2003, are required to provide a response to the bulletin within 30 days, with other responses due within 90 days. Donald C. Cook Nuclear Plant Unit 1 will begin a refueling outage prior to December 31, 2003, therefore requiring a 30 day response.

Attachment 1 to this letter provides the information requested within 30 and 90 days of the date of the bulletin. Attachment 2 contains the commitment made in this letter.

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Should you have any questions, please contact Mr. Brian A. McIntyre, Manager of Regulatory Affairs, at (269) 697-5806.

Sincerely,

R. P. Powers
Executive Vice President

Attachments

1. Nuclear Regulatory Commission Bulletin 2003-02: Leakage from Reactor Pressure Vessel Lower Head Penetration and Reactor Coolant Pressure Boundary Integrity Thirty-Day Response
2. Commitment

DB/rdw

c: K. D. Curry, Ft. Wayne AEP, w/o attachments
J. E. Dyer, NRC Region III
J. T. King, MPSC, w/o attachments
MDEQ – WHMD/HWRPS, w/o attachments
NRC Resident Inspector
M. A. Shuaibi, NRC Washington, DC

AFFIRMATION

I, Robert P. Powers, being duly sworn, state that I am Executive Vice President of American Electric Power Service Corporation and Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this request with the Nuclear Regulatory Commission on behalf of I&M, and that the statements made and the matters set forth herein pertaining to I&M are true and correct to the best of my knowledge, information, and belief.

American Electric Power Service Corporation

R. P. Powers
Executive Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 17 DAY OF September, 2003

Notary Public

My Commission Expires Apr. 4, 2004

DANIELLE M. SCHRADER
Notary Public, Berrien County, MI
My Commission Expires Apr 4, 2004

ATTACHMENT 1 TO AEP:NRC:3054-14

NUCLEAR REGULATORY COMMISSION BULLETIN 2003-02: LEAKAGE FROM REACTOR PRESSURE VESSEL LOWER HEAD PENETRATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY THIRTY-DAY RESPONSE

In Bulletin 2003-02, the Nuclear Regulatory Commission requested that pressurized-water reactor licensees provide information related to inspections that have been or will be performed to verify the integrity of the reactor pressure vessel (RPV) lower head penetrations. The bulletin also requested that licensees provide the basis for concluding that their plants satisfy applicable regulatory requirements related to the structural and leakage integrity of the RPV lower head penetrations. Licensees with facilities entering refueling outages before December 31, 2003, are required to provide a response to the bulletin within 30 days, with other responses due within 90 days. Donald C. Cook Nuclear Plant (CNP) Unit 1 will begin a refueling outage prior to December 31, 2003, requiring a 30 day response. The requested information for the 30 and 90 day responses is provided below.

Requested Information (1)(a)

A description of the RPV lower head penetration inspection program that has been implemented at your plant. The description should include when the inspections were performed, the extent of the inspections with respect to the areas and penetrations inspected, inspection methods used, the process used to resolve the source of findings of any boric acid deposits, the quality of the documentation of the inspections (e.g., written report, video record, photographs), and the basis for concluding that your plant satisfies applicable regulatory requirements related to the integrity of the RPV lower head penetrations.

Response to (1)(a)

The CNP Unit 1 and Unit 2 RPV lower heads are approximately 20 feet from the floor in the reactor pit. The RPV lower heads are covered by reflective metallic insulation that is bolted to a framework which is suspended from the vessel nozzles from above. The insulation is accessible from temporary scaffolding. Each penetration is surrounded by an Alloy 600 weld overlay on the carbon steel. The penetration tubes were installed with a slip fit of 0.003 to 0.006 inch (Unit 1) and 0.005 to 0.020 inch (Unit 2).

Based on the results of the South Texas Project Unit 1 inspection of the lower head and bottom mounted instrumentation performed on April 12, 2003, CNP has determined that the Boric Acid Corrosion Control Program is not intrusive enough with respect to the lower head. Therefore, a voluntary bare metal visual inspection with insulation removed was performed during the Unit 2 refueling outage that concluded in June 2003.

A complete bare metal visual inspection was performed on the Unit 2 RPV lower head and all 58 instrument penetrations. Scaffolding was constructed in the reactor pit to permit access to the insulation. The insulation was then unbolted from the lower head to allow access to the head and the penetrations. The insulation removal allowed visual examination of the vessel above the

outer row of penetrations. The inspection was performed using a high resolution camera, qualified to American Society of Mechanical Engineers (ASME) VT-3 standards, mounted on a pole and manipulated by personnel in contact with the examiners. Images acquired were processed directly to electronic media. Additional lighting was used to ensure the annulus around each penetration could be clearly seen.

The inspection was recorded by VT-2 examiners using a CNP approved inspection procedure. This procedure was developed for the purpose of performing remote or direct visual examinations to detect and characterize boric acid deposits due to leakage. The results of the inspection of each penetration and of the bare metal were documented in a data sheet contained in the procedure. Information recorded on the data sheet is the examination area (for this examination, the penetration number or the carbon steel surface area), the disposition of the examination results (accepted or rejected), the examination method, and any limitations or remarks about the examined area. The video from the high resolution camera and the documented results of the VT-2 Level II examiner were then verified and reviewed by a site Level III qualified examiner.

The inspection revealed boric acid trails and corrosion on the surface of the head in several areas. The boric acid trails came from sources above the penetrations. In some cases, the boric acid trails partially covered the Alloy 600 weld pads and obscured the ability to clearly determine whether the boric acid was coming from the associated penetration. The boric acid in these areas was scraped away and re-inspected to VT-1 visual exam requirements. Each annulus was found clear of boric acid.

Samples of the boric acid deposits were taken from eight locations including the RPV lower head. Six of these samples were from areas at penetrations, one was from insulation, and one was from ductwork on the wall in the reactor pit. From a visual examination, the samples appeared to be predominately boric acid with varying degrees of discoloring presumed to be caused by iron oxides and other impurities. Each sample was analyzed for boron, lithium, and isotopically for the purpose of estimating the deposit age. Cesium 134/137 ratios were calculated on those samples that contained measurable concentrations of these nuclides. The sample ratio was compared to the ratio that exists for cesium in the reactor coolant. The degree to which the ratio varied from the coolant ratio was the basis for the age estimate. By this method, the deposits were estimated to be eight to fifteen years old.

On-site laboratory analysis confirmed that the deposits were predominately boric acid with a number of trace metal impurities. The absence of detectable lithium in all samples is evidence that the boric acid residues are likely the result of refueling cavity leakage occurring during past refueling operations and not the result of leaks from the penetrations. Borated water sources used to fill the refueling cavity do not contain lithium.

Following the completion of the inspection, the RPV lower head and general areas were cleaned. The camera was used to document a baseline for future inspections. The discolored areas of the

carbon steel were evaluated and found to have surface corrosion with no loss of bottom head material.

A similar inspection will be performed for the Unit 1 refueling outage scheduled to commence in October of this year.

The following regulatory requirements are applicable to assuring that the CNP Unit 1 and Unit 2 lower reactor vessel head integrity is maintained.

- Technical Specification 3.4.6.2, "Operational Leakage"
- 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants"
- 10 CFR 50.55a(g), "Inservice Inspection Requirements"
- Updated Final Safety Analysis (UFSAR) Chapter 1.4.6 CNP Design Criterion 33, "Reactor Coolant Pressure Boundary Capability"
- UFSAR Chapter 1.4.6 CNP Design Criterion 34, "Reactor Coolant Pressure Boundary Rapid Propagation Failure Prevention"
- UFSAR Chapter 1.4.6 CNP Design Criterion 36, "Reactor Coolant Boundary Surveillance"

Technical Specification 3.4.6.2 prohibits any reactor coolant pressure boundary leakage. Compliance with this technical specification is accomplished by designing the reactor coolant pressure boundary to accommodate design transients without rupturing (Design Criterion 33 and 34), measuring reactor coolant system leakage during operation to detect leakage (Design Criterion 36), and inspecting the reactor coolant pressure boundary for leakage indications (10 CFR 50.55a(g) and Design Criterion 36). These activities are performed and documented by trained personnel in accordance with established procedures (10 CFR 50, Appendix B).

These activities provide assurance that the integrity of the lower reactor vessel head is maintained. The recently completed Unit 2 and the future Unit 1 lower reactor vessel head bare metal visual examination provide added confidence that the lower reactor vessel head integrity for both units is maintained.

Requested Information (1)(b)

Provide a description of the RPV lower head penetration inspection program that will be implemented at your plant during the next and subsequent refueling outages. The description should include the extent of the inspections which will be conducted with respect to the areas and penetrations to be inspected, inspection methods to be used, qualification standards for the inspection methods, the process used to resolve the source of findings of boric acid deposits or corrosion, the inspection documentation to be generated, and the basis for concluding that your plant will satisfy applicable regulatory requirements related to the structural and leakage integrity of the RPV lower head penetrations.

Response to (1)(b)

Bare-metal visual inspections of the Unit 1 and Unit 2 RPV lower head and penetrations will be conducted at each refueling outage. Insulation will be modified or removed from the RPV lower heads to permit full bare-metal visual examinations of the penetrations and carbon steel in the vicinity of the penetrations. ASME qualified VT-2 examiners will perform the inspections. Boric acid deposits will be analyzed, if sufficient residue exists, from deposits found. Both hard copy examination results based upon approved procedures and optical records will be retained. Regulatory compliance is discussed in the response to (1)(a).

Requested Information (1)(c)

If you are unable to perform a bare-metal visual inspection of each penetration during the next refueling outage because of the inability to perform the necessary planning, engineering, procurement of materials, and implementation, are you planning to perform bare-metal visual inspections during subsequent refueling outages? If so, provide a description of the actions that are planned to enable a bare-metal visual inspection of each penetration during subsequent refueling outages. Also, provide a description of any penetration inspections you plan to perform during the next refueling outage. The description should address the applicable items in paragraph (b).

Response to (1)(c)

CNP will perform a bare-metal visual inspection of the Unit 1 and Unit 2 RPV lower head and penetrations at each refueling outage; therefore, this request is not applicable to CNP.

Requested Information (1)(d)

If you do not plan to perform either a bare-metal visual inspection or non-visual (e.g., volumetric or surface) examination of the RPV lower head penetrations at the next or subsequent refueling outages, provide the basis for concluding that the inspections performed will assure applicable regulatory requirements are and will continue to be met.

Response to (1)(d)

CNP will perform a bare-metal visual inspection of the Unit 1 and Unit 2 RPV lower head and penetrations at each refueling outage; therefore, this request is not applicable to CNP.

ATTACHMENT 2 TO AEP:NRC:3054-14

COMMITMENT

The following table identifies those actions committed to by Indiana Michigan Power Company (I&M) in this document. Any other actions discussed in this submittal represent intended or planned actions by I&M. They are described to the Nuclear Regulatory Commission (NRC) for the NRC's information and are not regulatory commitments.

Commitment	Due Date
Bare-metal visual inspections of the Unit 1 and Unit 2 RPV lower head and penetrations will be conducted at each refueling outage. Insulation will be modified or removed from the RPV lower heads to permit full bare-metal visual examinations of the penetrations and carbon steel in the vicinity of the penetrations. ASME qualified VT-2 examiners will perform the inspections. Boric acid deposits will be analyzed, if sufficient residue exists, from deposits found. Both hard copy examination results based upon approved procedures and optical records will be documented.	Every Unit 1 and Unit 2 Refueling Outage.